

# PERFORMANCE TASK SAMPLE

## Science

### Middle School

#### Nostradamus, 2012

*A descendent of Nostradamus has predicted that earthquakes and volcanoes in 2012 will spell the end of life on earth. Can you use your knowledge of science and your ability to communicate scientific information to help calm a panicking public?*

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# Nostradamus, 2012

## Principal ELA competency assessed:

### **Construct Sound Arguments**

*Draw and defend conclusions about scientific phenomena, based in logical thinking and powerful and sufficient evidence.*

## Additional ELA competencies assessed:

### **Develop Interpretations and Explanations**

*Analyze data, design powerful models, and develop insightful conclusions about scientific phenomena, systemic relationships, and the intersection of science and human societies.*

### **Question and Critique Claims**

*Question and critique the work of other scientists (including classmates) and lay people, identifying possible flaws or errors in their procedures, analysis, or application of scientific ideas.*

### **Communicate**

*Communicate scientific information and ideas clearly and effectively, adjusting to address different audiences and purposes.*

### **Contribute**

*Work effectively as an individual, a member of a team, and a member of society to build scientific communities that support a shared commitment to excellence in inquiry, analysis, interpretation, and communication; and to build a better society.*

## **NY State Science Standards addressed and assessed at a major level:**

### **Standard 1—Scientific Inquiry**

#### **Intermediate**

1. The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

Students:

- construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena.
- represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others.
- seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists.

### **Standard 2 – Information Systems**

#### **Intermediate**

1. Information technology is used to retrieve, process, and communicate information and as a tool to enhance learning.

Students:

- use a range of equipment and software to integrate several forms of information in order to create good quality audio, video, graphic, and text-based presentations.

3. Information technology can have positive and negative impacts on society, depending upon how it is used.

Students:

- use graphical, statistical, and presentation software to present projects to fellow classmates.

### **Standard 4 - Physical Science**

#### **Intermediate**

Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

- explain how the atmosphere (air), hydrosphere (water), and lithosphere (land) interact, evolve, and change
- describe volcano and earthquake patterns, the rock cycle, and weather and climate changes

### **Standard 7—Interdisciplinary Problem Solving**

#### **Intermediate**

Key Idea 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/ technology/ society, consumer decision making, design, and inquiry into phenomena.

- Analyze science/ technology/ society problems and issues at the local level and plan and carry out a remedial course of action.
- Design solutions to real-world problems of general social interest related to home, school, or community using scientific experimentation to inform the solution and applying mathematical concepts and reasoning to assist in developing a solution.



## **Nostradamus, 2012**

Student assignment sheet

The *Weekly World Screamer* has printed the predictions of the great, great, great (and a few more greats) grandson of Nostradamus. As you might expect from this kind of supermarket tabloid, Nostradamus Jr. predicts widespread destruction from earthquakes and volcanoes.

The country is in a panic. People are fleeing their homes. The President has raised the national security level to red, and has called upon geologists from coast to coast to use their knowledge of geology to assure people that the threat is not real. He has asked you to create a work that will reassure Americans of their safety, sharing your deep understanding of earthquake, volcanoes, and plate tectonics.

Use your knowledge of earth science and your ability to create a powerful argument to calm the United States and the World.

You might:

- give a radio or television interview
- create a public service announcement for TV or radio
- create a two-page article for the center of *Newsweek*, using illustration and text
- write a one-page magazine article, with an illustration
- create a PowerPoint presentation that you could use for a town meeting

## Nostradamus, 2012

### Possible Learning Activities

*This unit requires that students:*

- *gain knowledge and understanding of earthquakes and volcanoes,*
- *understand the earth's axis and the forces that keep the earth in orbit around the sun*
- *develop scientific arguments*
- *critique scientific claims*

*Possible specific activities might include these:*

- Provide direct instruction and allow students to construct and/or view models of earthquake and volcano processes
- Working from either a map of fault lines OR a map of volcano and/or earthquake areas (but not a map that superimposes the two kinds of information), ask students to identify patterns and predict the implications.
- View video or earthquake and volcanoes, to understand the processes and appreciate the degree of destruction that is possible.
- What happens if an earthquake occurs at sea? Have students create a model to simulate a tsunami. Read about the recent tsunami in Japan.
- Have students visit the website of Dihydrogen Monoxide (<http://www.dhmo.org/>) and work in small groups to draw conclusions about the danger of this molecule. What scientific information did students use to draw those conclusions? Guide them MINIMALLY to realize that Dihydrogen Monoxide is water. Ask them to reconsider the claims made on the site. Are they valid? Why or why not? How might they respond to some of the claims made?
- Give students their horoscopes for the day (for example, from <http://www.washingtonpost.com/horoscopes>). HOWEVER, instead of giving them their correct horoscope, re-title the horoscope so that it reflects the NEXT sign in the zodiac. (For example, copy and paste the CANCER horoscope and re-title it LEO; take the LEO horoscope but re-title it VIRGO on your handout, etc. moving each sign "off" by one. Now, without telling students what you have done, ask them to rate their general belief in horoscopes as well as the accuracy / value of the "new" horoscope you just gave them. Lead the discussion for a while; at the right moment, say – OH! I just realized! I made a mistake in copying and pasting these horoscopes. Your real hor4oscope is the sign before, etc. so the
- Ask students to respond to advertisements that might include false or misleading scientific information, including, perhaps, super-hydrating water, energy drinks containing "natural caffeine," cereal with "dehydrated organic cane juice," shampoos with all kind of strange (and non-existent) materials like micro-oils. Should they use these products? Why or why not?

- Develop a scientific argument about a topic in earth science, such as “should a nuclear power plant be built on a fault line?” or “should the US Forest Service force people to evacuate from the area around a large, dormant volcano?”
- Introduce the performance task and rubrics, answering questions. The task itself requires only a simple introduction, as it builds on the learning events in the unit.
- Halfway through completion of the task, pair students so that they can give and get feedback from a peer on the quality of their work so far, then make adjustments.

## **Ideas for Differentiation**

(the beginnings of a list)

- Provide basic information on earthquakes and volcanoes by using various kinds of sources to reach students with different learning styles. Include lecture, reading, video, paired conversations, and manipulatives.
- Support students in choosing an appropriate mode for sharing their argument (see the student assignment sheet for possible modes).
- Integrate additional visual texts of various sorts, including videos, photographs, and/or charts and graphs
- Support English language learners by including vocabulary keys for more challenging texts or offering simplified versions
- Extend this unit into research by assigning teams responsibility for researching and presenting reports on the damage caused by significant earthquakes and volcanoes, including:
  - Mt. St. Helen’s
  - Vesuvius
  - The Japanese tsunami
  - The Haiti earthquake
  - The Sichuan earthquake of 2008
  - The Mt. Tambora earthquake of 1816

# **Weekly World !Screamer!**

# NOSTRADAMUS REBORN !

*Reincarnated seer predicts  
disaster. Nation panics.*

New York, NY— The United States has erupted in panic, fearing earthquakes and volcanoes that threaten the very continuance of life on earth.

The great, great, great, great, great, great, great, great, great grandson of Nostradamus revealed himself to the world on Thursday morning, in a press conference outside New York City Hall.

Until this point, Freddy Nostradamus has kept a low profile, preferring to guard his privacy. Thursday, however, he broke his silence, explaining, “I have an obligation to save innocent Americans from impending disaster.” Co-incidentally, he also announced the sale of his new book, *Doomed Continent*, and his “Disaster Survival Kit.”

Nostradamus has made these predictions:



Artist's rendering of the volcano that will soon surface in Baton Rouge, Louisiana

- an earthquake centered in Washington, DC will split the US into two pieces on March 22, dropping seven eastern states (and their inhabitants) into the Atlantic Ocean
- a previously undiscovered volcano, located under Baton Rouge, LA, will erupt suddenly, spewing ash 20 miles into the air and covering the entire South in hundreds of tons of debris
- the volcanic eruption will plunge the US into an endless summer, as ash particles fill the air and trap energy from the sun in the atmosphere
- after these events, the earth will no stop spinning on its axis and will no longer rotate around the sun. These disasters will be the final natural disasters on planet Earth.